

Giovanni Research Highlights 2012

Newly published papers that used
Giovanni !

These highlighted papers will also appear in the next issue of the Giovanni News (in press)

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Paper: Movement patterns for a critically endangered species, the leatherback turtle (*Dermochelys coriacea*), linked to foraging success and population status

Authors: Helen Bailey, Sabrina Fossette, Steven J. Bograd, George L. Shillinger, Alan M. Swithenbank, Jean-Yves Georges, Philippe Gaspar, K. H. Patrik Strömberg, Frank V. Paladino, James R. Spotila, Barbara A. Block, and Graeme C. Hays

- The researchers studied leatherback turtle populations in the Atlantic and Pacific Oceans. In this study, Giovanni was used to plot a long-term mean of 8-day chlorophyll *a* concentrations for the period 2002-2010. Tracks of leatherback turtles tagged with satellite transmitters were overlain on the chlorophyll *a* concentration map. The map shows that the North Atlantic population moves between the high latitudes where the spring bloom occurs, and the subtropics, while the Pacific population moves between the coast of Central America and the southeast Pacific, sometimes in areas with very low chlorophyll concentrations.

A radio-tagged leatherback turtle heading back to the ocean



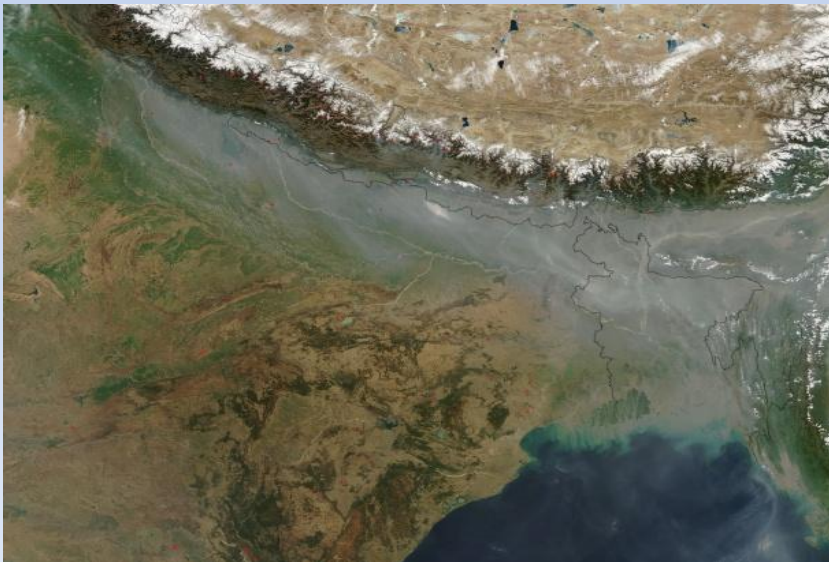
Paper: Long-range transportation of anthropogenic aerosols over eastern coastal region of India: Investigation of sources and impact on regional climate change

Authors: S.K. Das and A. Jayaraman

- In this study, the authors sought to distinguish the primary components and sources of increased atmospheric aerosols over a remote coastal location in southern India, Kalpakkam (Tamil Nadu province). One of the difficulties of such an effort for a coastal location is the influence of the local meteorology, characterized by the diurnal influence of land and sea breezes. (Land breezes occur at night, blowing toward the sea from the land, and sea breezes occur during the day, blowing from the sea toward the land, due to differences in the temperature of the land surface and the sea surface).

The researchers determined, using air parcel tracking, that observed increases in aerosol optical depth were primarily due to long-range transport of anthropogenic aerosols from the Indo-Gangetic Basin (IGB). In particular, black carbon in the atmospheric aerosols was found to be considerably higher when the wind blew from the IGB as compared to winds blowing from either the northern Indian Ocean or the central Bay of Bengal. Notably, when the wind was blowing from the IGB, the researchers observed a 65% increase in atmospheric radiative forcing, which corresponds to a 70% increase in the aerosol heating rate.

MODIS aerosol optical depth data acquired from Giovanni were utilized in this research.



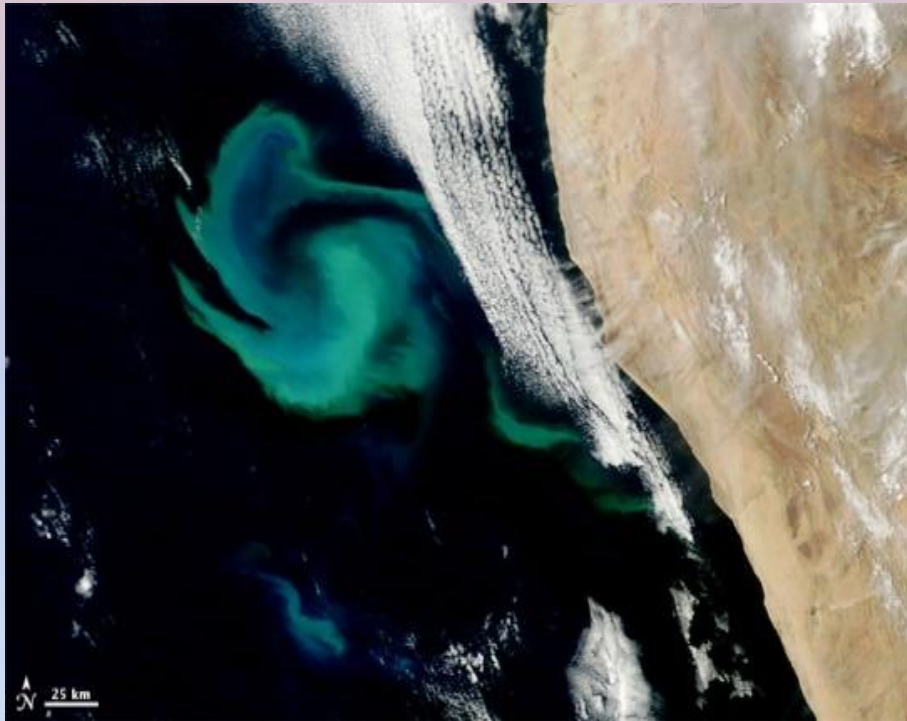
**Haze in the Indo-Gangetic
Basin**

MODIS image, February 2006

Paper: Physical oceanographic influences on central Benguela fish catch

Author: Mark R. Jury

- In this study, Mark Jury of the University of Puerto Rico - Mayaguez (who has used Giovanni in many research papers) investigates the physical oceanographic factors affecting the fish catch in the central Benguela upwelling zone. Giovanni supplied both SeaWiFS chlorophyll *a* data for a 10-year climatology and also the annual cycle of mixed layer depth, via the NASA Ocean Biogeochemical Model data portal. [*NOBM will be the subject of a presentation on Day 2, from Cecile Rousseaux*]
- Jury describes the factors which lead to increased fish catch as a weakening of southeasterly winds, which leads to an approximately 0.5 degree Celsius increase in ocean water temperature down to a depth of 200 meters. There is also a weak downwelling near the coast, which keeps the chlorophyll concentration at an optimum level for the Benguela fishery.



The Benguela Upwelling Zone has provided many unique images from space, such as this phytoplankton bloom (likely composed of coccolithophores) observed by MODIS.

The current Giovanni ocean data portal includes several ocean optical data products, as well as the Particulate inorganic Carbon data product, which helps quantify the mass of calcium carbonate and carbon produced by this form of phytoplankton.

Paper: Estimated range of black carbon dry deposition and the related snow albedo reduction over Himalayan glaciers during dry pre-monsoon periods.

Authors: T.J. Yasunari, Q. Tan, K.-M. Lau, P. Bonasoni, A. Marinoni, P. Laj, M. Ménégoz, Takemura, and M. Chin

- The authors of this study used seven different estimation techniques to put upper and lower bounds on the amount of black carbon the Himalayan ice pack receives. Their results indicated a range of 900-1300 micrograms per square meter were deposited on the ice during the pre-monsoon period (March-May) in 2006. This amount of deposition can reduce the visible albedo by about 5%.
- Aerosol optical depth data from MODIS-Terra and MODIS-Aqua were acquired via Giovanni to illustrate black carbon deposition events occurring on March 31 and April 17, 2006. It should also be noted that data from the Goddard Chemistry Aerosol Radiation and Transport (GOCART) model was used in this investigation.

A very “cool” image of the Himalayas from the International Space Station !

